

WHAT IS CLAIMED IS:

1. A modified pyrogenic toxin derived from a native disulfide loop-containing pyrogenic toxin, wherein the modified toxin comprises a disulfide loop region containing no more than 10 amino acid residues.
2. The modified toxin of claim 1 wherein the native disulfide loop-containing pyrogenic toxin is a staphylococcal toxin or a streptococcal toxin.
3. The modified toxin of claim 2 wherein the staphylococcal toxin is a type A, B, C, D, E, G, or H staphylococcal enterotoxin.
4. The modified toxin of claim 2 wherein the streptococcal toxin is streptococcal pyrogenic exotoxin A or streptococcal superantigen.
5. The modified toxin of claim 1 wherein the disulfide loop region contains no more than 6 amino acid residues.
6. The modified toxin of claim 1 wherein the native disulfide loop-containing pyrogenic toxin is a type C staphylococcal enterotoxin.
7. The modified toxin of claim 7 wherein the modification comprises a deletion of at least 8 amino acid residues within the disulfide loop region.
8. The modified toxin of claim 8 wherein the modification comprises a deletion of amino acid residues 98-106.
9. The modified toxin of claim 7 wherein the modification comprises deletion of at least 12 amino acid residues within the disulfide loop region.
10. The modified toxin of claim 10 wherein the modification comprises deletion of amino acid residues 95-106.
11. The modified toxin of claim 7 wherein the type C staphylococcal enterotoxin is staphylococcal enterotoxin C1.

- 11  
12 13. The modified toxin of claim 12 comprising a cysteine residue at position 94.

14. The modified toxin of claim 7 wherein the staphylococcal enterotoxin is

5 staphylococcal enterotoxin C1, staphylococcal enterotoxin C2, staphylococcal enterotoxin C2, staphylococcal enterotoxin C-MNCPoland, staphylococcal enterotoxin C-4446, staphylococcal enterotoxin C-bovine, staphylococcal enterotoxin C-canine or staphylococcal enterotoxin C-ovine.

14  
15. The modified toxin of claim 1 comprising a cysteine residue at position 2 of the disulfide loop region.

15  
16. The modified toxin of claim 1 having substantially decreased toxicity in  
comparison to the native toxin.

15  
16  
17. The modified toxin of claim 15 having an emetic response inducing activity decreased by at least about 100-fold in comparison to the native toxin.

17  
18. The modified toxin of claim 15 having an fever inducing activity decreased by  
20 at least about 100-fold in comparison to the native toxin.

18  
19. The modified toxin of claim 16<sup>15</sup> having an LD<sub>50</sub> in Dutch Belted rabbits which is at least about 100-fold higher than the native toxin.

25 <sup>19</sup>~~20~~. A modified pyrogenic toxin derived from a native disulfide loop-containing pyrogenic toxin, wherein the modification comprises deletion of at least about 40% of the amino acid residues within the disulfide loop of the native toxin.

20  
21. The modified pyrogenic toxin of claim 20 comprising a cysteine residue at  
30 position 2 of the disulfide loop region.

21 ~~22.~~ The modified pyrogenic toxin of claim <sup>19</sup>20 wherein the native pyrogenic toxin is a type C staphylococcal enterotoxin.

22  
23. An isolated nucleotide acid comprising a nucleotide sequence encoding a  
35 modified pyrogenic toxin derived from a native disulfide loop-containing pyrogenic

toxin, wherein the modified toxin comprises a disulfide loop region which includes no more than 10 amino acid residues.

23

24. An isolated nucleotide acid comprising a nucleotide sequence encoding a modified staphylococcal enterotoxin derived from a native staphylococcal enterotoxin, wherein the modification comprises deletion of at least about 40% of the amino acid residues within the disulfide loop region of the native enterotoxin.

5

24

25. A modified pyrogenic toxin derived from a native type C staphylococcal enterotoxin, wherein the modified toxin comprises a disulfide loop region which includes no more than 10 amino acid residues.

10

25

26. The modified toxin of claim 25 wherein the disulfide loop region is Cys-Cys-Gly-Lys-Thr-Cys.

15